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GRID STATISTICAL SAMPLING BASED METHODOLOGY

(GridStats) VERSION 1.2

USER'S MANUAL

For U.S. Army Engineer Division
Huntsville, Alabama

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1.0 INTRODUCTION

The OE Grid Statistical Sampling Based Methodology (SiteStats) implements the methodology developed by QuantiTech, Inc., for U.S. Army Engineer Division, Huntsville, in support of the Division's role as the Ordnance and Explosives (OE) Mandatory Center of Expertise (MCX). The tool is intended to assist the OE MCX in fully characterizing grids within given statistical bounds with minimal sampling. Specifically, the idea behind GridStats is to accept a small level of uncertainty within an individual sampling grid (i.e., sample <100% of the anomalies) in exchange for a much greater understanding of the contamination of the overall site.

2.0 STARTING GridStats

Written and compiled in Visual Basic, the software does not require any purchased applications support since it was developed as a stand-alone executable. The Remediation Planning Tool database used is in Access 2.0. The user does not need to know anything about Visual Basic or Access for code execution.

2.1 SYSTEM REQUIREMENTS

* A master copy of the GridStats 1.2 Disk,
* An IBM PC or compatible computer,
* A graphics card compatible with Microsoft Windows 3.0 or later,
* 4 megabytes (MB) of random-access memory (RAM),
* MS-DOS version 3.1 or later and Microsoft Windows 3.0 or later,
* A mouse or other compatible pointing device,
* 5 megabytes (MB) of hard disk storage space.

2.2 INSTALLING THE SOFTWARE

* Start **Microsoft Windows**.
* Insert the master disk into drive A or drive B.
* From the **File** menu in either the **Program Manager** or **File Manager**, choose **Run** (A dialog box similar to the one shown in Figure 2.2-1.)
* Type (**a:setup**) or (**b:setup**) depending on which drive is in use.
* Click **OK**.
* Follow any additional instructions provided on the screen.

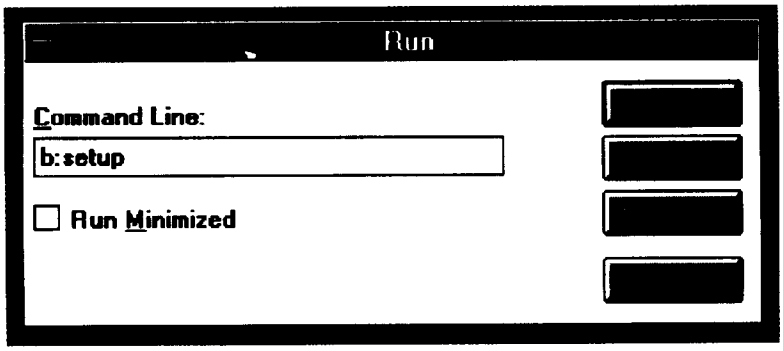

Figure 2.2-1. Run Command Line

2.3 LAUNCHING GRIDSTATS

* In the **Program Manager** window, double-click the **GridStats** group icon or the group icon that contains **GridStats 1.2**.
* Double-click the **GridStats** program icon.
* The window shown in Figure 2.3-1 will be displayed.

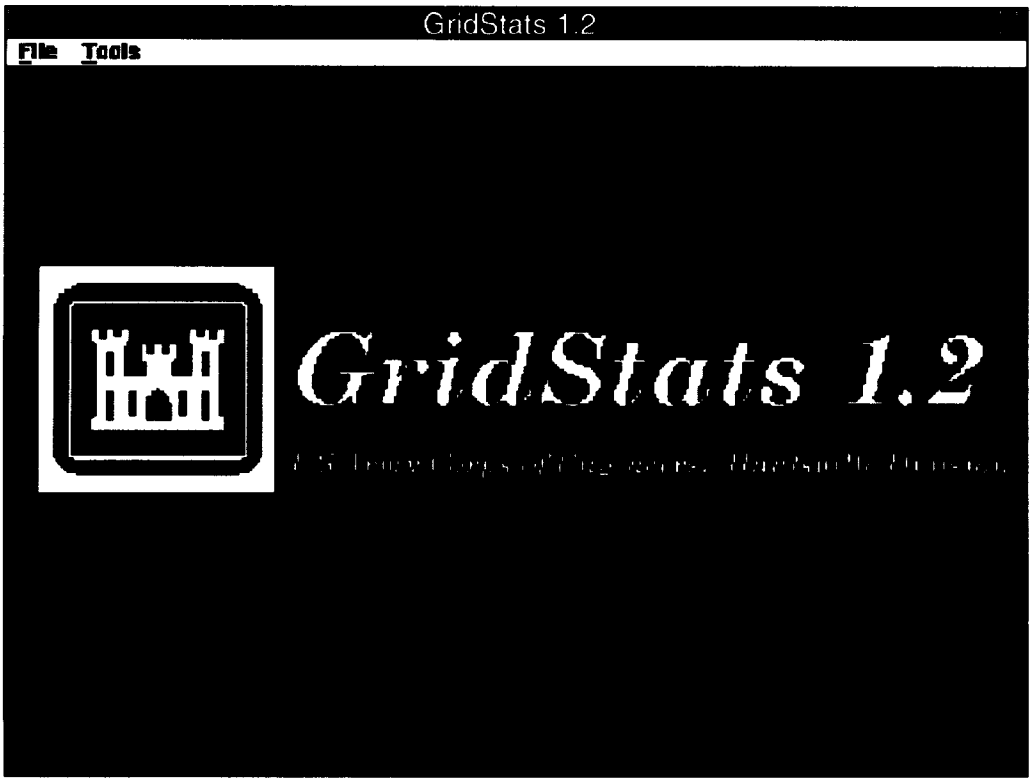

Figure 2.3-1. GridStats Main Window

2.4 EXITING FROM GRIDSTATS

* From the **GridStats File** menu choose **Exit.**
* A dialog box will appear asking the user to verify the decision to quit.
* Click **Exit** to quit or **Cancel** to remain in the program.

3.0 BASICS OF USING GridStats

3.1 COMMANDS AND MENUS

GridStats offers two ways to choose commands:

* From the menu bar,
* Using shortcut keys.

Choosing a Command from the Menu Bar:

* Point to the menu name in the menu bar that contains the command you want, drag the mouse to that command, and then release it to select the command.
* The user may also click the menu name and then click the command.
* Use the keyboard (instead of mouse) by typing the underlined letter in the desired command.

For additional instruction about choosing menu commands, refer to the Microsoft Windows User's Guide.

3.2 DIALOG BOXES

GridStats displays numerous dialog boxes to obtain information from the user. These dialog boxes may include areas in which text or numbers are entered. Dialog boxes may also allow settings to be changed or notify the user of some decision. It may also display additional information or request confirmation.

For more information about general dialog box procedures, consult the Microsoft Windows User's Guide.

3.3 OPENING SAVED DATA

* Choose **Open** from the **File** menu.
* A dialog box, similar to the one shown in Figure 3.3-1, appears allowing the user to switch drives and/or directories.
* Select the desired file.

* Click the **OK** button to open the file.

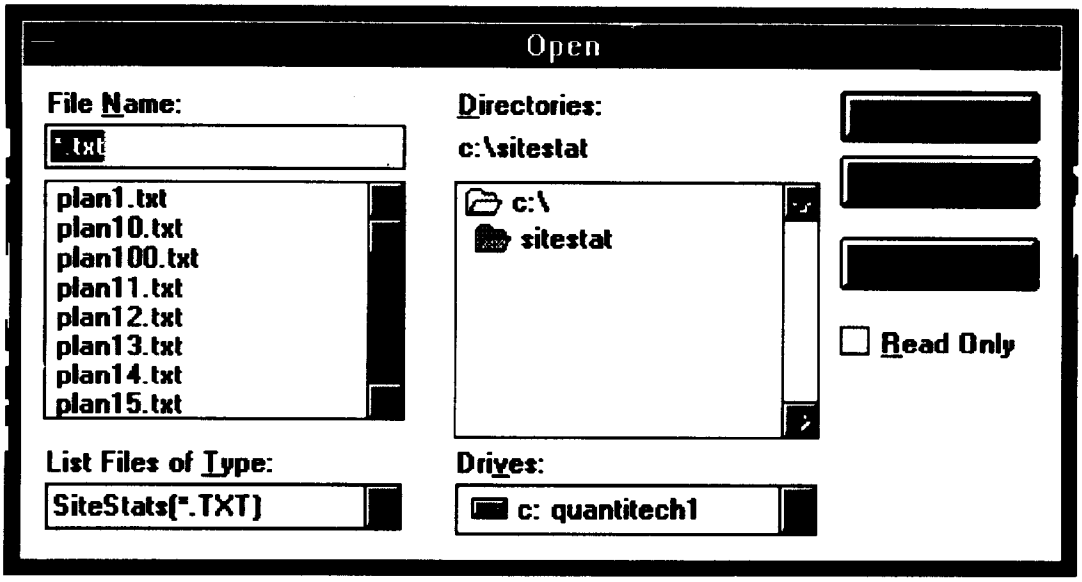

Figure 3.3-1. Opening Saved Data

3.4 SAVING DATA

When you finish a GridStats session, save your data before you exit the program. Two commands on the **File** menu will allow the user to save the data.

* Use the **Save As** command to save your data for the first time and give it a name, see Figure 3.4-1.
* Use the **Save** command to save changes to an existing data file.

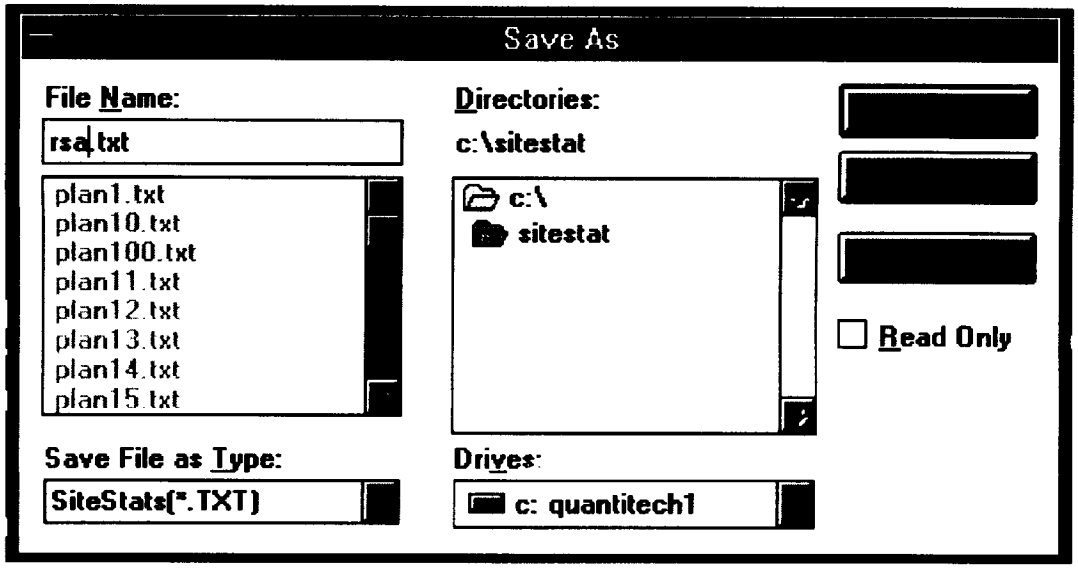

Figure 3.4-1. Saving Files

3.5 BEGINNING A NEW EVALUATION

* Choose **New Grid Evaluation** from the **File** menu.
* Select **Easy Step Method.**

3.6 OTHER MENUS ON THE MAIN SCREEN

In addition to the **File** menu, a **Tools** menu exists on the main screen. From the **Tools** menu the user may choose **Edit Sample** to correct any input errors. Also, the user may choose **View Results** to display a grid's output.

4.0 GRID SAMPLING

4.1 GRID SIZE DEFINITION

The dimensions of the grids to be used in sampling must be entered in the **Grid Dimensions** dialog box. Length and width dimensions of the grid may be entered in feet, yards, or meters.

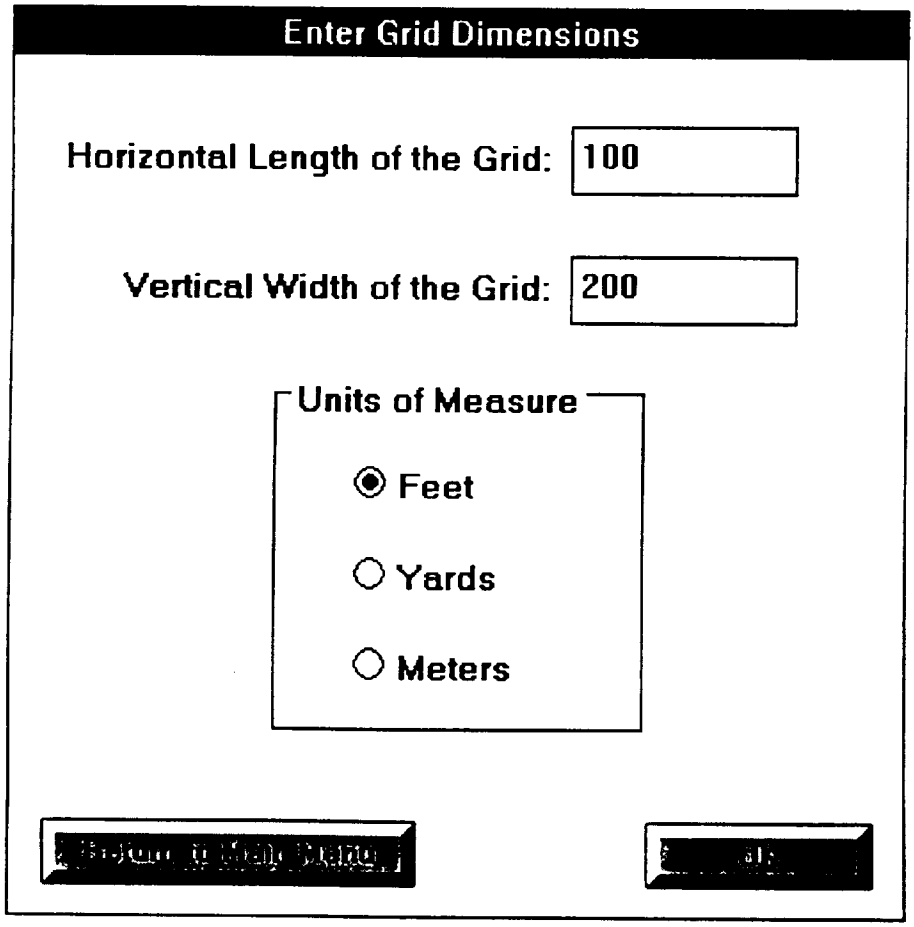

Figure 4.1-1. Grid Dimensions Dialog Box

* Open the **File** menu.
* Select **New Grid Evaluation**.

* Choose **Easy Step Method**.
* Enter the length and width of the grid.
* Choose unit of measure.
* Click **OK**.

4.2 GRID INFORMATION

Information concerning the grid undergoing evaluation may be input in the **GridStats Inputs** dialog box as shown in Figure 4.2-1. The data items are: site where work is occurring, sector in which the grid is contained, date the sampling is performed, the clearance depth for the grids sampling, an identifier for the grid, and the total anomalies identified.

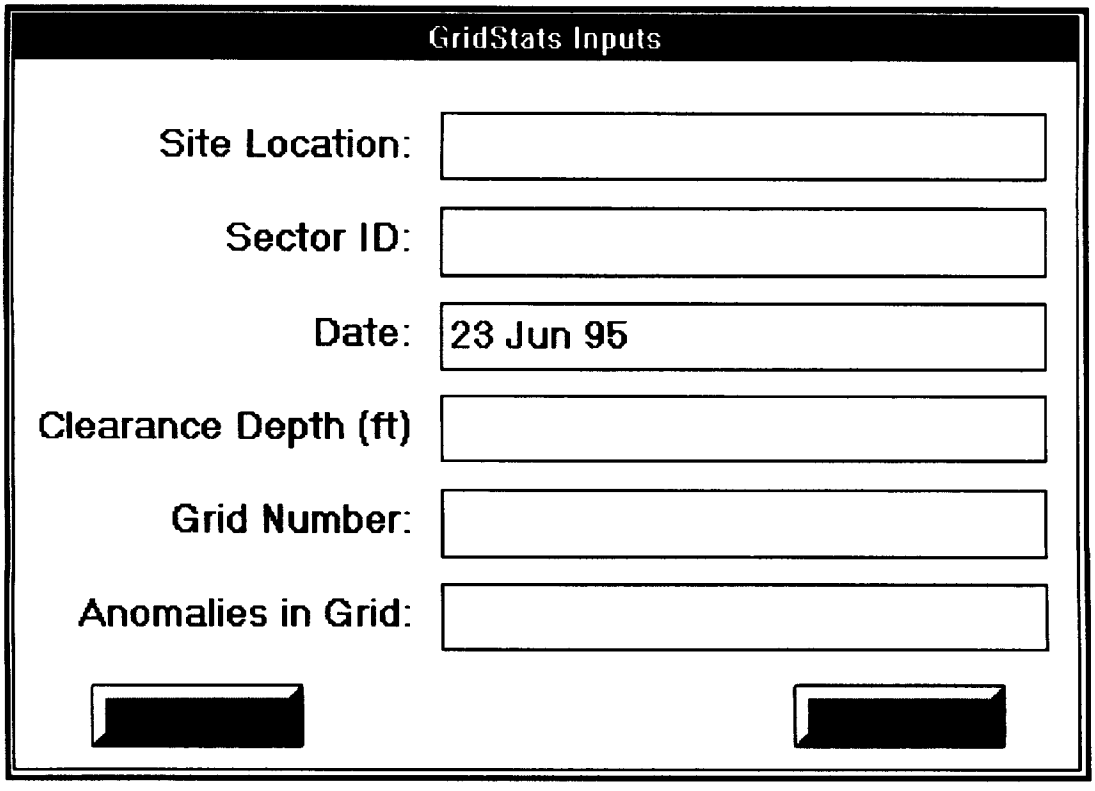

Figure 4.2-1. Grid Information Dialog Box

* Enter the site name and sector ID (optional).

* Enter the grid's clearance depth (optional).
* Input a unique grid identifier (optional).
* Input the number of anomalies identified (required).
* Click **OK**.

4.3 Sampling Sequence Within a Grid

GridStats will specify which sampling sequence list is to be used for the grid investigation. The sampling sequence lists (100 are available–each with 1,500 locations within the grid) are provided to ensure anomalies within a grid are investigated in a random process.

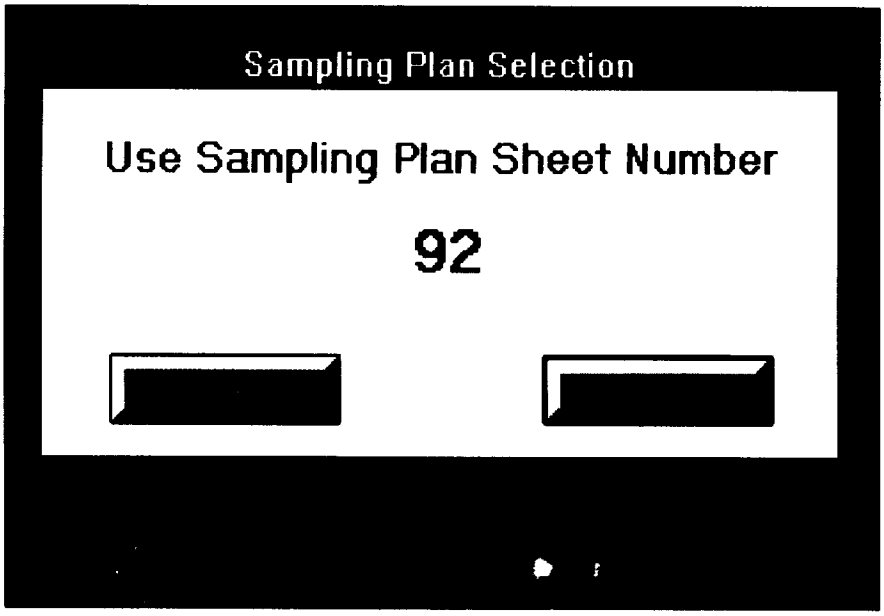

Figure 4.3-1. Sampling Plan Number

* Click **Print** to generate a printed copy of the sampling plan (recommended for field use).
* Follow the print commands.
* Click **OK**.

4.4 ANOMALY SAMPLING

Within a grid, anomalies to be sampled are identified in accordance with the referenced sampling sequence list. Results of each sampling are recorded until the software indicates that sampling may be halted.

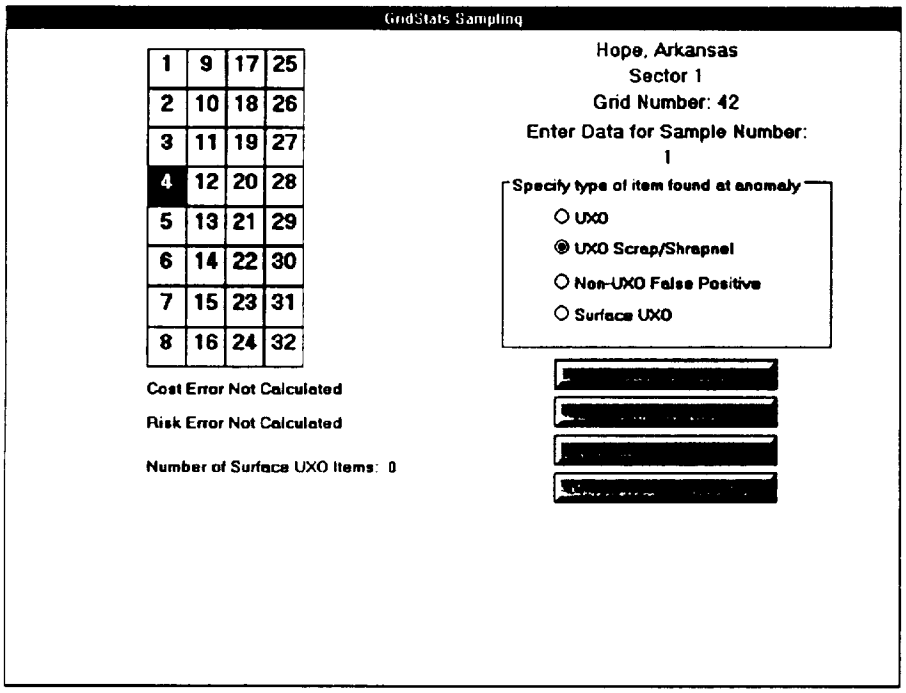

Figure 4.4-1. GridStats Sampling Display

* As the identified "square" is investigated, record the result of the investigation. If the anomaly is:
  - UXO - Click on **UXO** option button;
  - Frag/scrap - Click on **UXO Scrap/Shrapnel** option button;
  - Other metal or rock - Click on **Non-UXO False Positive** option button;
  - Click on **Surface UXO** for all found within the grid.

* Click **Record This Sample** to identify the anomaly.

* Click **Delay Sampling** to postpone grid sampling.

* Click **No Anomalies - New Location** when no anomalies are present in the current subgrid square.

4.5 SURFACE UXO

GridStats assumes that all ordnance found on the surface during an investigation will be identified and removed. The GridStats sampling routine provides for an accounting of surface UXO. Surface ordnance data is not used within this software to draw any statistical characterization of sub-surface UXO content.

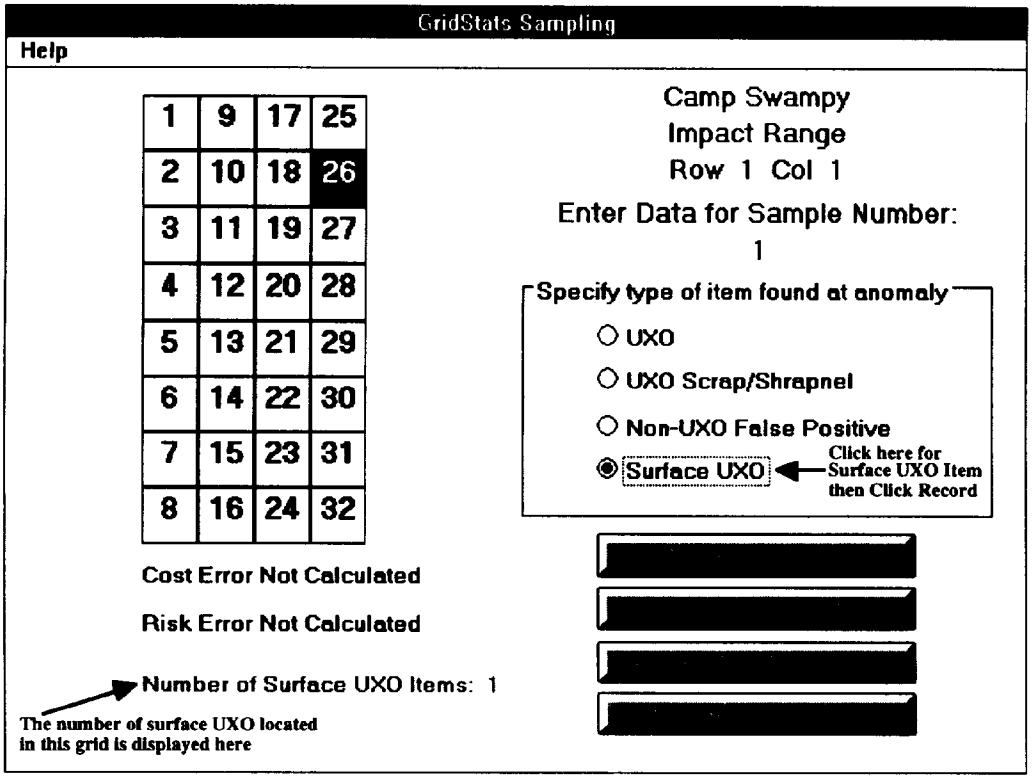

Figure 7.7-1. Surface UXO Count

4.6 GRID SAMPLING TERMINATION

When SiteStats indicates that grid sampling can be halted, one of three message boxes will be displayed.

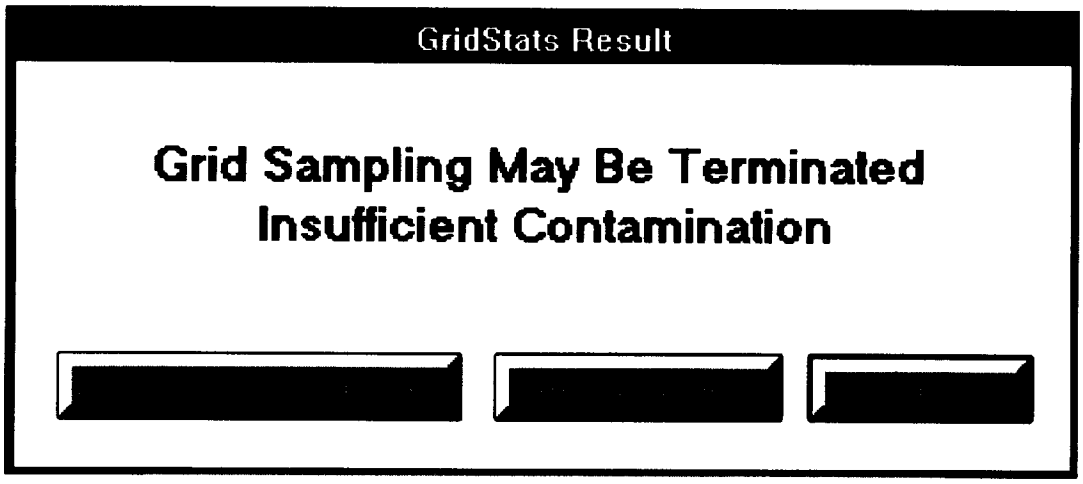

Figure 4.6-1. Less Contaminated Grid

The message in Figure 4.6-1 will be displayed when the grid may not require remediation.

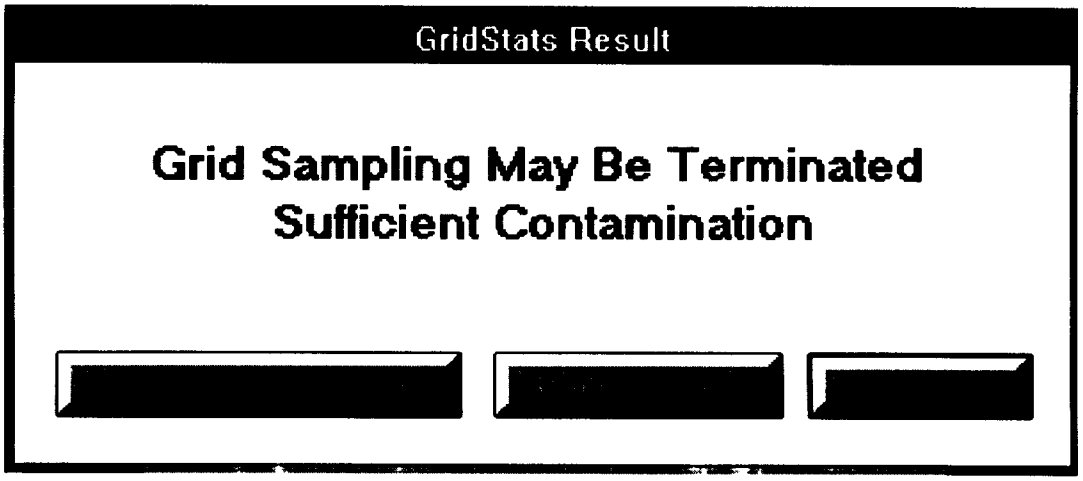

Figure 4.6-2. More Contaminated Grid

The message in Figure 4.6-2 will be displayed when the grid may require remediation.

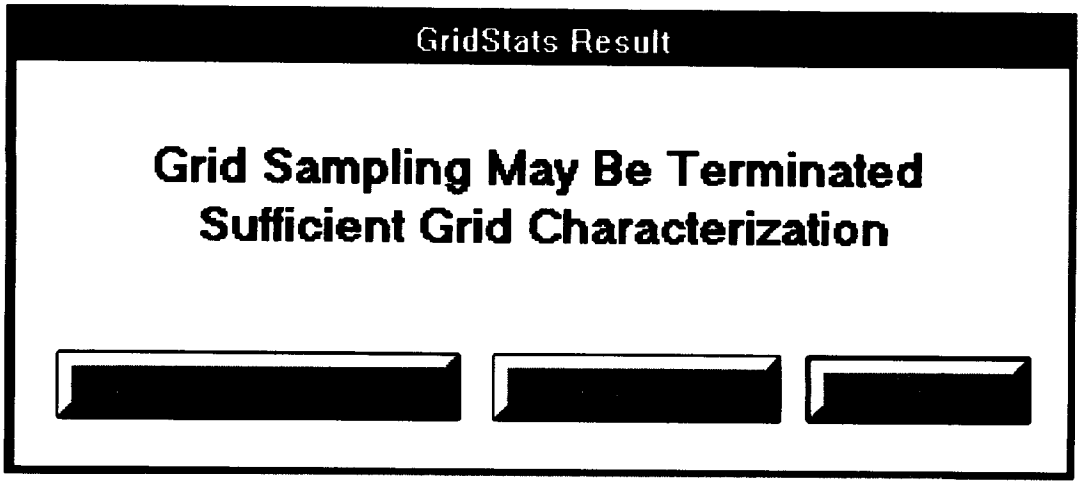

Figure 4.6-3. Grid Sufficiently Characterized

The message in Figure 4.6-3 will be displayed when the grid is otherwise characterized.

Notice that additional grid sampling can be performed after a conclusion has been drawn. Click **Continue Sampling Grid** to investigate additional anomalies.

4.7 GRID SAMPLING RESULTS

Click on **Display Results** to see the grid results. The graphic illustration in Figure 4.7-1 shows an example grid output screen. Click **Done** to return to the main window for further grid sampling.

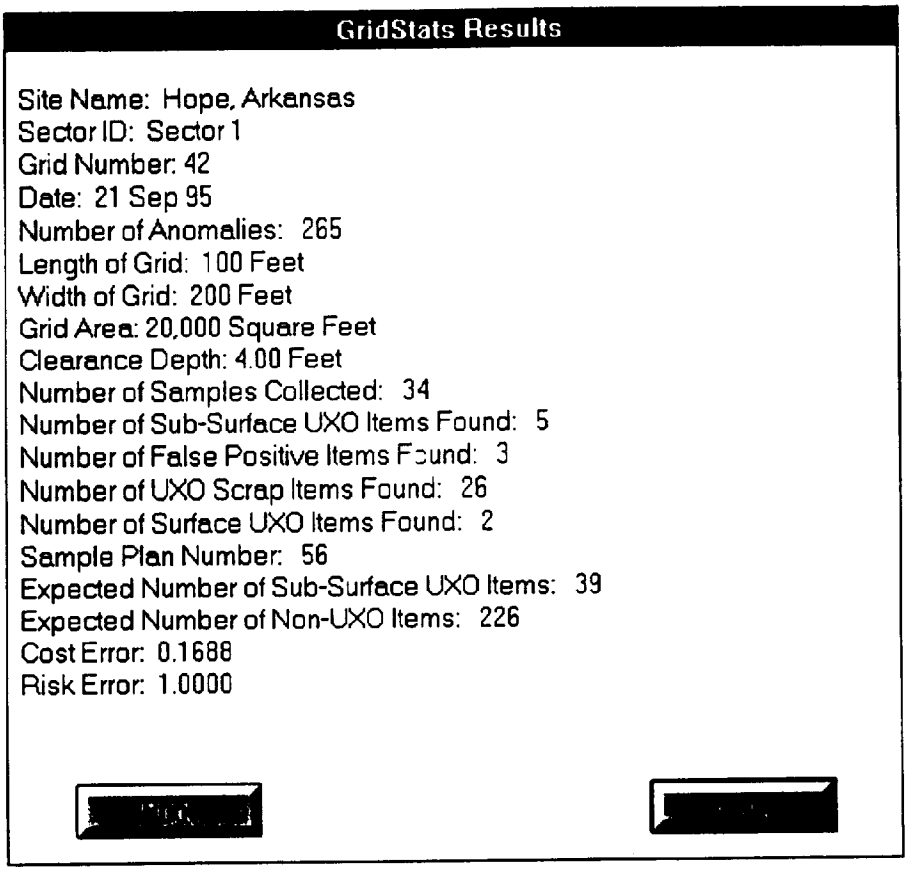

Figure 4.7-1. GridStats Summary Results

* Choose **Display Results** from **GridStats Results** message box.
* Click **Done** on the results screen to return to the **GridStats Results** message box.

Grid results may be print.

* Choose **Print** from the **File** menu.
* Select the data you wish to print (grid results and sample sequence).
* Click **OK** on the print screen and follow the printer's instruction.

GRIDSTATS SAMPLING SEQUENCE

Site Name: Fort Devens
Sector ID: C-1
Grid Number: 53
Date: 28 Sep 95

Sample Number	Sub-Grid Location	Description of Item
1	21	UXO Scrap
2	25	UXO Scrap
3	8	UXO Scrap
4	9	UXO Scrap
5	30	UXO Scrap
6	5	UXO
7	29	UXO Scrap
8	9	UXO Scrap
9	29	UXO Scrap
10	18	UXO
11	10	False Positive
12	9	False Positive
13	30	False Positive
14	4	False Positive
15	5	False Positive
16	29	False Positive
17	29	False Positive
18	1	False Positive
19	32	False Positive
20	15	UXO
21	11	UXO Scrap
22	6	UXO Scrap
23	20	UXO Scrap
24	12	UXO Scrap
25	6	UXO Scrap
26	11	UXO Scrap
27	5	False Positive
28	10	False Positive
29	4	False Positive
30	31	False Positive
31	21	False Positive
32	28	False Positive
33	28	False Positive
34	17	False Positive
35	31	False Positive
36	28	False Positive
37	2	False Positive
38	4	UXO
39	22	UXO

Figure 4.7-2. Sampling Sequence Output

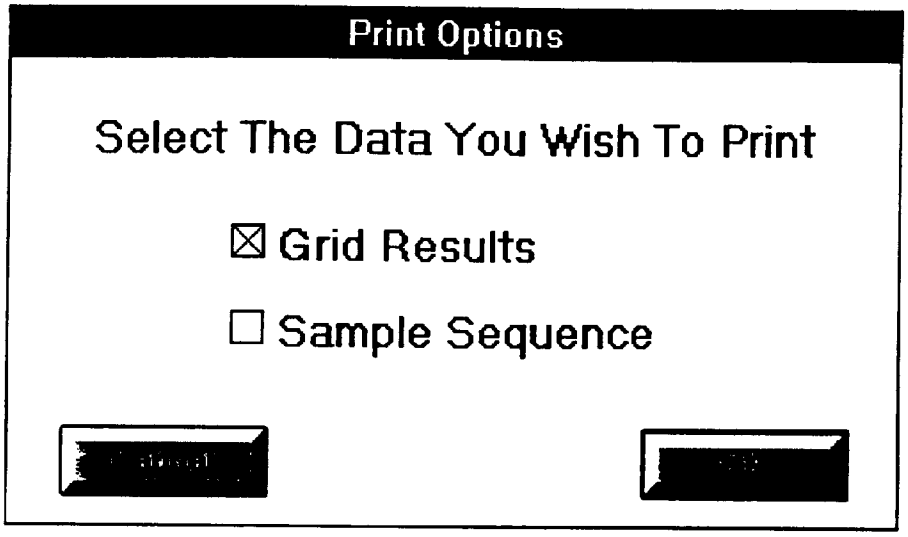

Figure 4.7-3. GridStats Output Print Options

4.8 SAVING GRID DATA

When you have begun sampling a grid, you can save the grid data. When you save a grid, the original file is overwritten with the new one.

From the GridStats Sampling Screen,

* Click **Delay Sampling.**
* Open **File Menu.**
* Select **Save.**
* If you are saving a sector for the first time:
  - Type a name for the file;
  - Click **OK.**
* The default file extension for grid data is **.TXT.**

4.9 SAMPLING IN A SAVED GRID

To work with existing grid data, you need to copy it from a floppy or hard disk into memory, known as opening a file. When you open a file it is copied into memory, but the original remains on the disk unchanged until you save the file again.

* Open the **File** menu.
* Select **Open**.
* On the **Open** dialog box, change to the correct drive and/or directory, if necessary.
* Click the name of the file to be opened.
* Click **OK** or press **Enter**.
* Open the **Tools** menu.
* Select **Continue Sampling**.